**Bridge Basics Investigation**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Please go to the website:

<http://www.pbs.org/wgbh/buildingbig/bridge/basics.html>

We rely on bridges to cross obstacles like streams, valleys, and railroad tracks. But do you know how they work? Or why some bridges are curved while others are straight? Engineers must consider many things -- like the distance to be spanned and the types of materials available -- before determining the size, shape, and overall look of a bridge.

Please use the website to help you complete your bridge building investigation so that you are prepared for the BRIDGE BUILDING CHALLENGE!

|  |
| --- |
| [Image of a Beam Bridge](http://www.pbs.org/wgbh/buildingbig/bridge/beam.html) |
| Beam bridge |

_**The beam bridge**

1. What is a beam? (hint: click on underlined words for definitions)
2. What is a pier?
3. What direction does the weight push on this bridge?
4. What distance are beam bridges usually used to cross?

|  |
| --- |
| [Image of Cantilever Bridge](http://www.pbs.org/wgbh/buildingbig/bridge/firth_forth.html) |
| Cantilever bridge: Firth of Forth |

_**The truss bridge**

Bridge in Scotland

1. What is the basic shape used to make a truss bridge?
2. Click on : [Check out the forces that act on truss bridges!](http://www.pbs.org/wgbh/buildingbig/bridge/truss_forces.html) And look at the picture of the forces (shown by the red and blue arrows) that are on the bars of this type of bridge.

Do the top bars of the bridge experience a pushing or pulling force?

Do the bottom bars experience a pushing or pulling force?

1. What is a cantilever?
2. Which type of bridge can span a greater distance, truss bridges or beam bridges?

|  |
| --- |
| [Aqueduct bridge - click to view larger image](http://www.pbs.org/wgbh/buildingbig/bridge/aqueduct.html) |
| Ancient Roman aqueduct |

_**The arch bridge**

1) What are some materials that can be used to build arch bridges?

2) What distance can arch bridges span?

3) Arch bridges are very strong because of the way the forces are distributed in the bridge. Click on : [Catch a glimpse of the forces that act on arch bridges!](http://www.pbs.org/wgbh/buildingbig/bridge/arch_forces.html) And draw a sketch of how the forces are distributed in an arch bridge.

4) Why is it difficult to build an arch bridge?

|  |
| --- |
| [Image of Suspension Bridge](http://www.pbs.org/wgbh/buildingbig/bridge/golden_gate.html) |
| Suspension bridge: Golden Gate Bridge |

_**The suspension bridge**

1. How far can suspension bridges span?
2. Click on: [See how forces act on suspension bridges!](http://www.pbs.org/wgbh/buildingbig/bridge/susp_forces.html) and explain how the road is attached to the bridge.
3. What part of the bridge supports most of its weight?

**Now that you've mastered the bridge basics, test your bridge-building skills in the** [**Bridge Challenge**](http://www.pbs.org/wgbh/buildingbig/bridge/challenge/index.html)**!** Below state the type of bridge that is best for each location

Location 1:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Location 2:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Location 3:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Location 4:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When you are finished check out this bridge building game: http://www.bridgebuilder-game.com/